

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of the claims in the applications.

Listing of Claims:

1-19. (canceled)

20. (Currently amended) A photonic input/output device, comprising:

(a) a layered structure comprising an unpatterned substrate having at least one layer and at least one additional layer on top of the unpatterned substrate,

(b) a coupling region that is within the at least one additional layer and that comprises an arrangement of at least one optical scattering element, and

(c) at least one output waveguide, wherein the at least one optical scattering element has an index contrast that is greater than or equal to approximately 1, and

wherein the at least one optical scattering element ~~is an element having geometrical shape different than a shape chosen from the group comprising cylinders, ellipsoids, hemispheres, rectilinear trenches or solids, cones, angled cylinders, angled hemispheres, angled ellipsoids, angled rectilinear trenches or solids and angled cones and wherein the spacing element to element may be uniform~~ comprises a first and a second scattering elements, and
wherein the first and the second scattering elements have different geometrical shape.

21. (Previously presented) The photonic input/output device of claim 20, further comprising a second output waveguide arranged to be approximately orthogonal to said at least one output waveguide.

22. (Previously presented) The photonic input/output device of claim 21, wherein said at least one optical scattering element comprises a diffraction grating structure.

23. (Previously presented) The photonic input/output device of claim 22, wherein said diffraction grating structure is a two-dimensional grating.

24. (Previously presented) The photonic input/output device of claim 23, wherein said at least one optical scattering element is at least one cylindrical hole.

25. (Previously presented) The photonic input/output device of claim 24, wherein said at least one cylindrical hole is an array of holes comprising one of a purely periodic grating pattern and a substantially periodic grating pattern.

26. (Previously presented) The photonic input/output device of claim 21, wherein the said at least one output waveguide and said second output waveguide are chosen from the group comprising ridge, slab and channel waveguides.

27. (Previously presented) The photonic input/output port of claim 24, further comprising an output boundary between said coupling region and said output wave guides, wherein the arrangement of at least one optical scattering element comprises two or more optical scattering elements and the volumes of the scattering materials gradually decrease as they approach the region near said approximately orthogonal output waveguides.

28. (Previously presented) The photonic input/output device of claim 20 wherein the unpatterned substrate serves as a reflector.

29. (Previously presented) The photonic input/output device of claim 28 wherein said unpatterned substrate serving as a reflector comprises a Bragg reflector.

30. (New) A photonic input/output device, comprising:

- (a) a layered structure comprising an unpatterned substrate having at least one layer and at least one additional layer on top of the unpatterned substrate,

- (b) a coupling region that is within the at least one additional layer and that comprises an arrangement of at least one optical scattering element, and

- (c) at least one output waveguide, wherein the at least one optical scattering element has an index contrast that is greater than or equal to approximately 1 and wherein the at least one optical scattering element is an element having geometrical shape chosen from the group consisting of elliptical hole, hemispherical hole, conical hole, rectangular hole, and geometrical shape having both vertical asymmetry and horizontal asymmetry.

31. (New) A photonic input/output device, comprising:

- (a) a layered structure comprising an unpatterned substrate having at least one layer and at least one additional layer on top of the unpatterned substrate,

- (b) a coupling region that is within the at least one additional layer and that comprises an arrangement of at least one optical scattering element, and

(c) at least one output waveguide, wherein the at least one optical scattering element has an index contrast that is greater than or equal to approximately 1,

wherein the at least one optical scattering element comprises a first and a second scattering elements, and

wherein the first and the second scattering elements have different geometrical volume.

32. (New) A photonic input/output device, comprising:

(a) a layered structure comprising an unpatterned substrate having at least one layer and at least one additional layer on top of the unpatterned substrate,

(b) a coupling region that is within the at least one additional layer and that comprises an arrangement of at least one optical scattering element, and

(c) at least one output waveguide, wherein the at least one optical scattering element has an index contrast that is greater than or equal to approximately 1,

wherein the at least one optical scattering element comprises a first and a second scattering elements, and

wherein the first and the second scattering elements are disposed in a first and a second layers respectively of the at least one additional layer.